

CLAIMS

What is claimed is:

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Sub 2
Alg 3

1. A scanning force microscope probe, comprising:
a cantilever having a first end and a second end; and
a reflective structure included on the cantilever such that at least a
portion of light that is directed to the cantilever in a first direction having a
directional component from the first end to the second end is reflected
from the reflective structure in a second direction having a directional
component from the second end to the first end.

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2. The scanning force microscope probe of claim 1 wherein the
first direction is substantially opposite to the second direction.

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3. The scanning force microscope probe of claim 1 further
comprising a tip disposed on a front side of the cantilever.

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4. The scanning force microscope probe of claim 1 wherein the
reflective structure comprises a reflective surface disposed on the back
side of the cantilever.

1 5. The scanning force microscope probe of claim 1 wherein the
2 reflective structure comprises a reflective surface disposed on a front side
3 of the cantilever.

1 6. The scanning force microscope probe of claim 1 wherein the
2 reflective structure comprises a diffraction grating disposed on the back
3 side of the cantilever.

1 7. The scanning force microscope probe of claim 1 wherein the
2 reflective structure comprises a diffraction grating disposed a front side of
3 the cantilever.

1 8. The scanning force microscope probe of claim 1 wherein the
2 cantilever comprises silicon.

1 9. The scanning force microscope probe of claim 1 wherein the
2 cantilever comprises silicon nitride.

1 10. The scanning force microscope probe of claim 1 wherein the
2 first end is a fixed end of the cantilever.

1 11. The scanning force microscope probe of claim 10 wherein the
2 fixed end of the cantilever is fixed to a chip having tapered sides.

1 12. The scanning force microscope probe of claim 1 wherein the
2 second end is a free end of the cantilever.

1 13. The scanning force microscope probe of claim 1 wherein a
2 front side of the cantilever is configured to be disposed near and spaced
3 apart from a surface of a sample such that the cantilever is capacitively
4 coupled to a signal line proximate to the surface of the sample.

1 14. The scanning force microscope probe of claim 1 wherein a
2 front side of the cantilever is configured to be in contact with a surface of a
3 sample such that the cantilever is coupled to a signal line proximate to the
4 surface of the sample.

1 15. A method of detecting motion of a scanning force microscope
2 probe cantilever, the cantilever having a first end and a second end, the
3 method comprising:
4 directing light to the cantilever in a first direction having a
5 directional component from the first end to the second end of the
6 cantilever;

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 7 reflecting at least a portion of the light from the cantilever in a
 8 second direction having a directional component from the second end to
 9 the first end of the cantilever; and
 10 receiving the portion of the light reflected from the cantilever to
 11 detect motion of the cantilever.

1 16. The method of claim 15 wherein the first direction is
 2 substantially opposite to the second direction.

1 17. The method of claim 15 further comprising capacitively
 2 coupling the cantilever to a signal line proximate to surface of a sample.

1 18. The method of claim 15 further comprising capacitively
 2 coupling a tip included on a front side of the cantilever to a signal line
 3 proximate to a surface of a sample.

1 19. The method of claim 15 further comprising contacting a front
 2 side of the cantilever with a surface of a sample such that the cantilever is
 3 coupled to a signal line proximate to the surface of the sample.

1 20. The method of claim 15 wherein reflecting at least the portion
 2 of the light from the cantilever in the second direction includes reflecting

3 the light from a reflective structure disposed on the back side of the
4 cantilever.

1 21. The method of claim 15 wherein reflecting at least the portion of
2 the light from the cantilever in the second direction includes reflecting the
3 light from a reflective structure disposed on the front side of the cantilever.

1 22. The method of claim 15 wherein reflecting at least the portion
2 of the light from the cantilever in the second direction includes diffracting
3 the light from a reflective structure disposed on the back side of the
4 cantilever.

1 23. The method of claim 15 wherein the reflecting at least the
2 portion of the light from the cantilever in the second direction includes
3 diffracting the light from a reflective structure disposed on the front side of
4 the cantilever.